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FIG.1

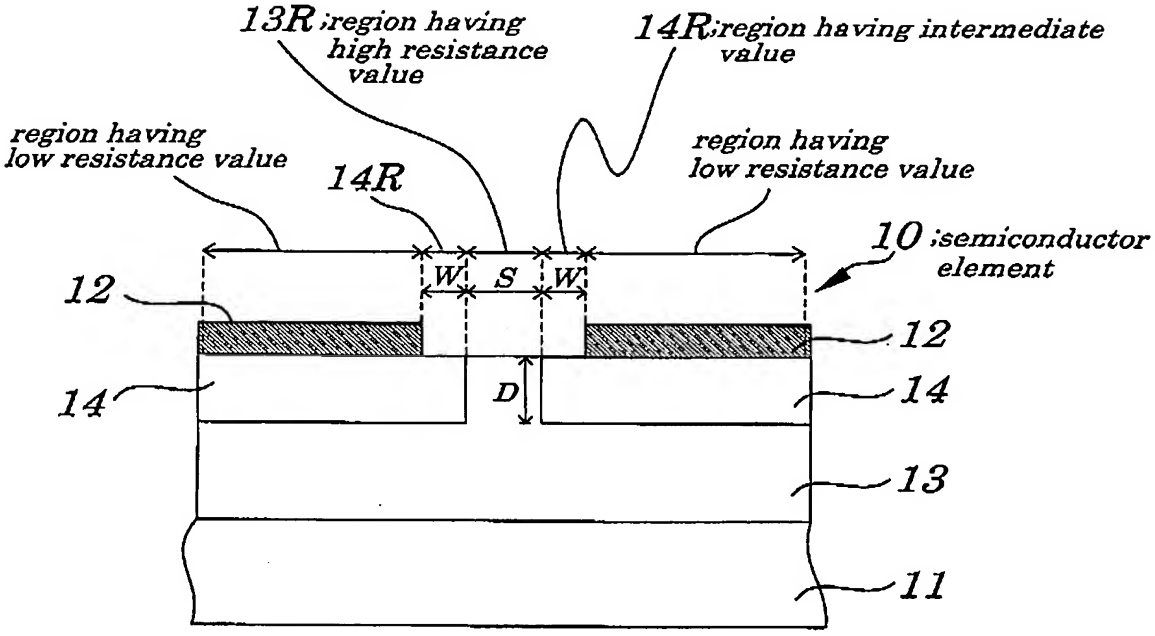
13R ;region having high resistance value
14R ;region having intermediate value
region having low resistance value
14R
region having low resistance value
10 ;semiconductor element
12
W
S
W
12
14
D
14
13
11

FIG.2

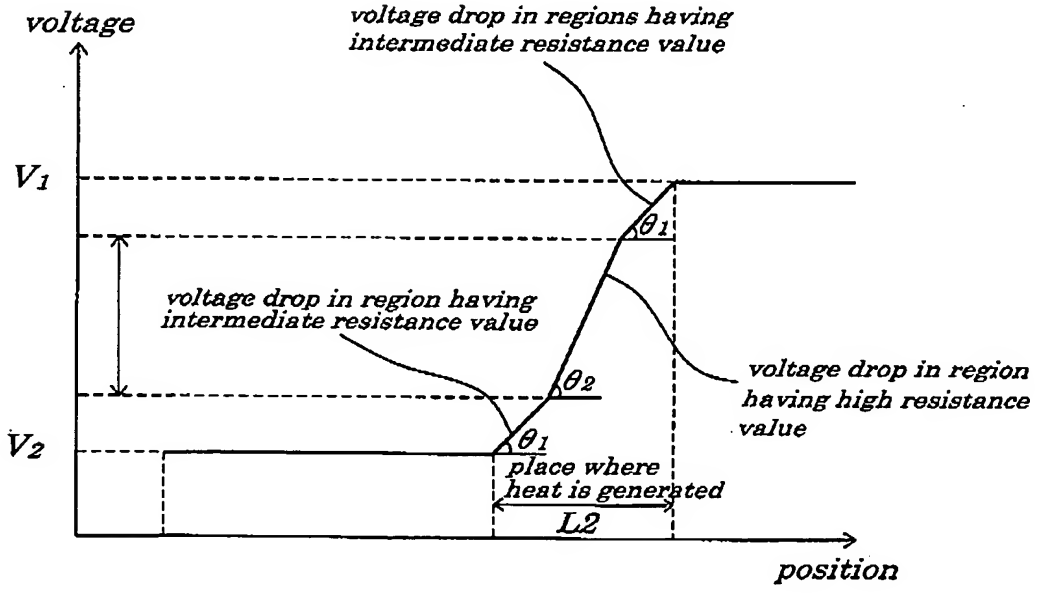
voltage
voltage drop in regions having intermediate resistance value
V1
θ1
voltage drop in region having intermediate resistance value
θ2
voltage drop in region having high resistance value
V2
θ1
place where heat is generated
L2
position

FIG. 3A (PRIOR ART)

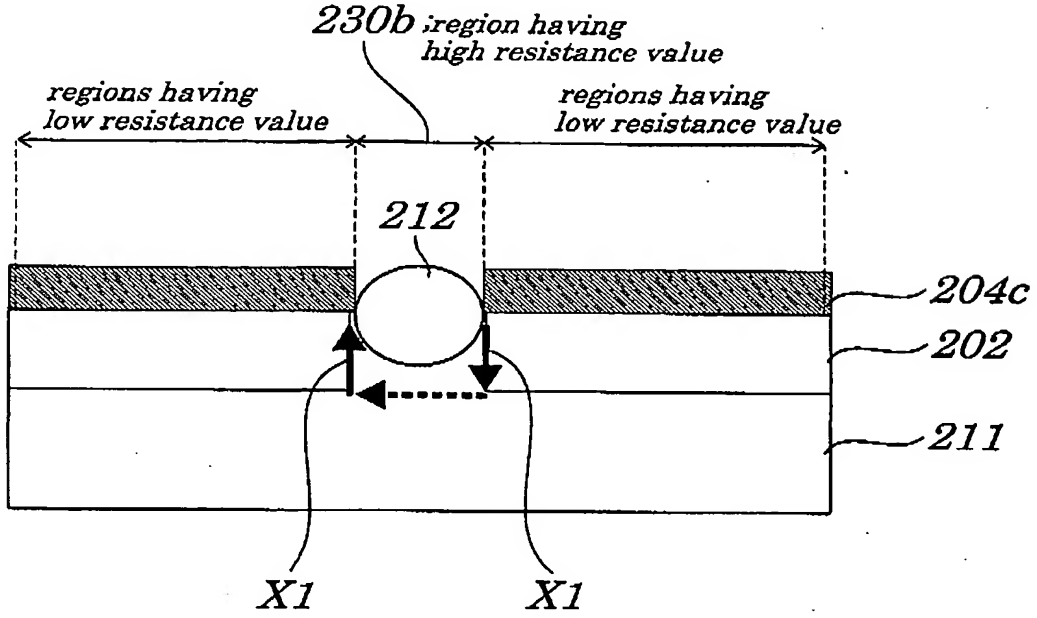

FIG. 3B

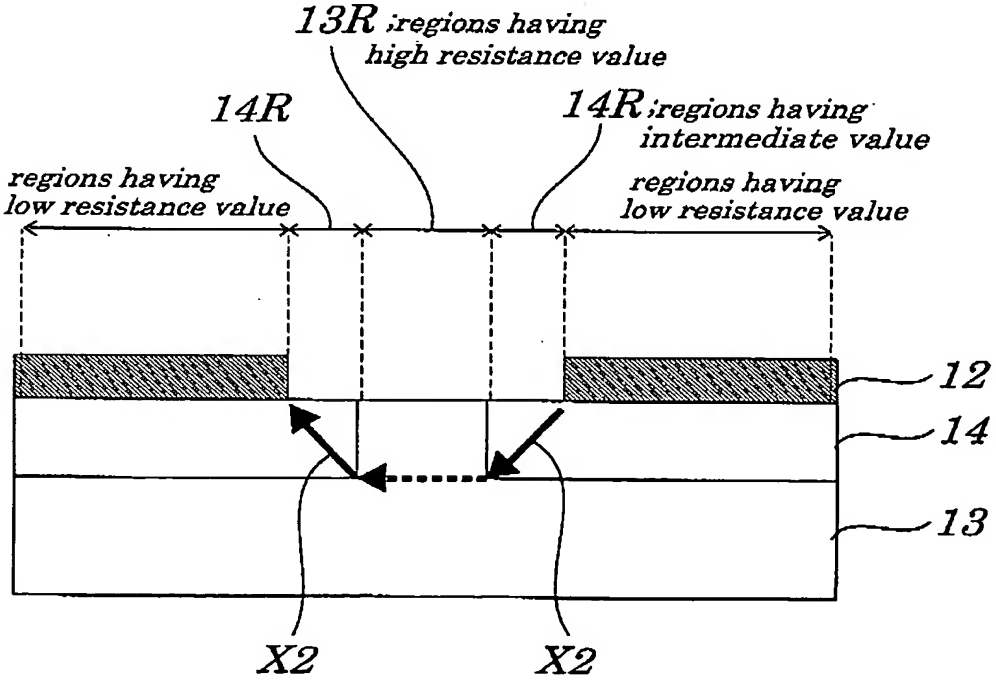

FIG. 4A

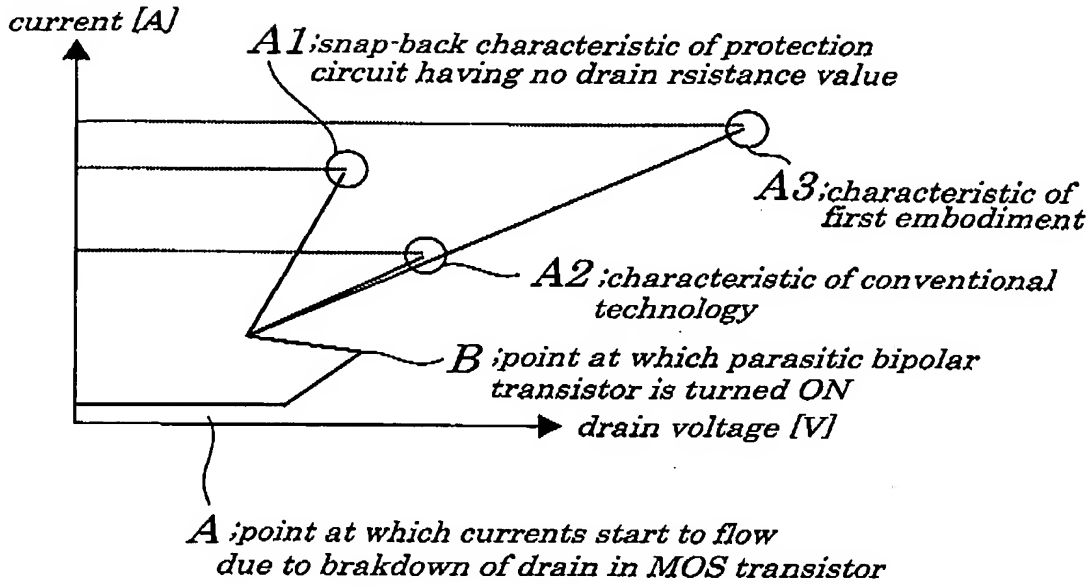
current [A]
A1 ;snap-back characteristic of protection circuit having no drain rsistance value
A3 ;characteristic of first embodiment
A2 ;characteristic of conventional technology
B ;point at which parasitic bipolar transistor is turned ON
drain voltage [V]
A ;point at which currents start to flow due to brakdown of drain in MOS transistor

FIG. 4B

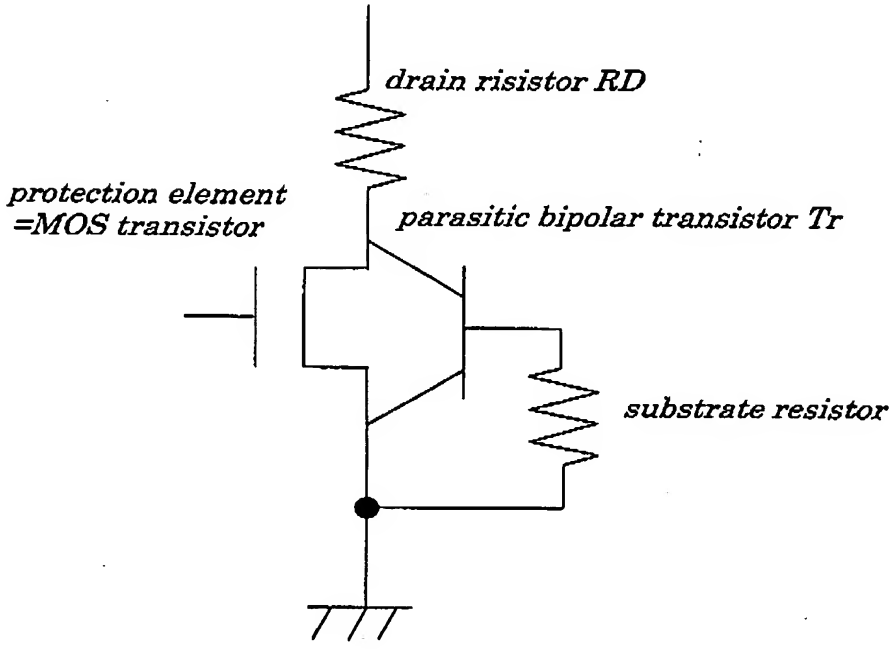
drain risistor RD
protection element =MOS transistor
parasitic bipolar transistor Tr
substrate resistor

FIG.5

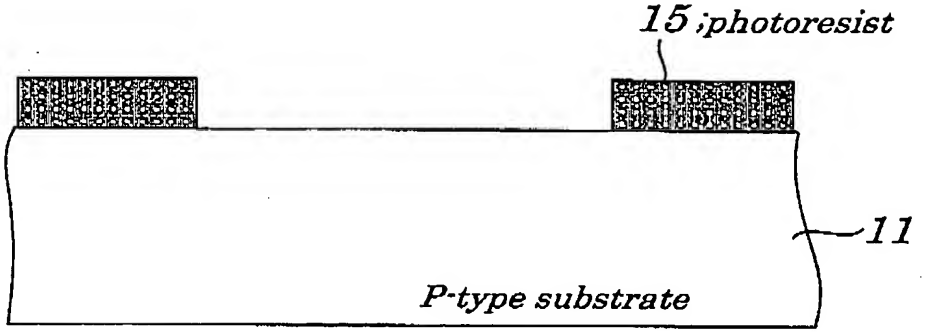
15 ;photoresist
11
P-type substrate

FIG.6

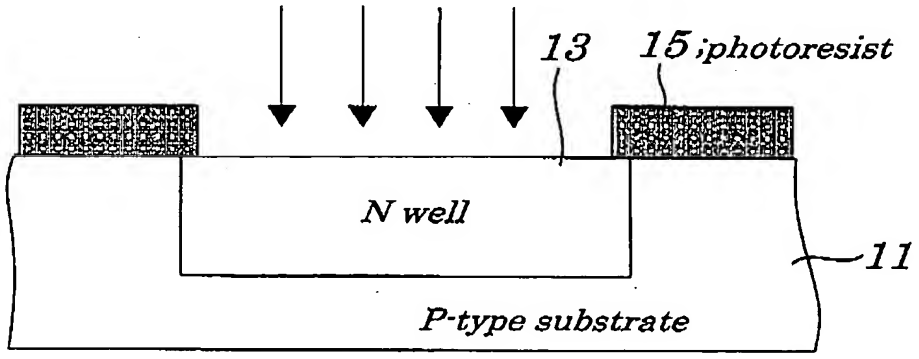
13
15 ;photoresist
N well
11
P-type substrate

FIG. 7

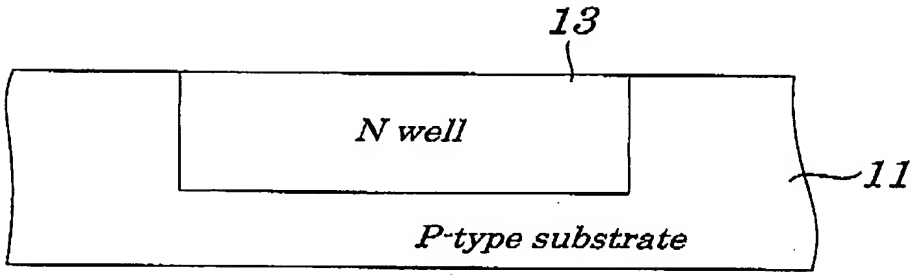
13
N well
11
P-type substrate

FIG. 8

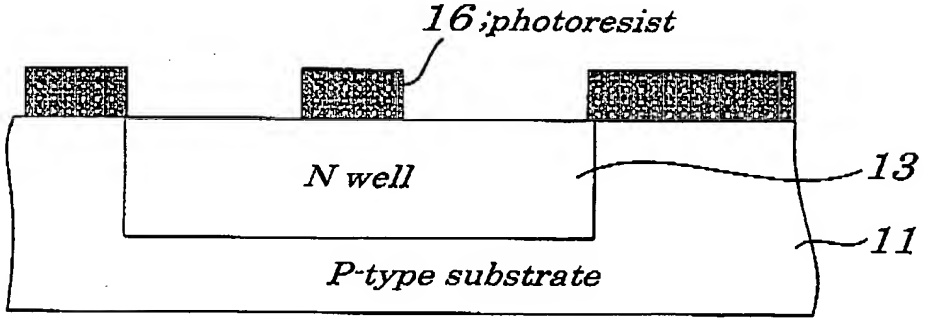
16;photoresist
N well
13
11
P-type substrate

FIG.9

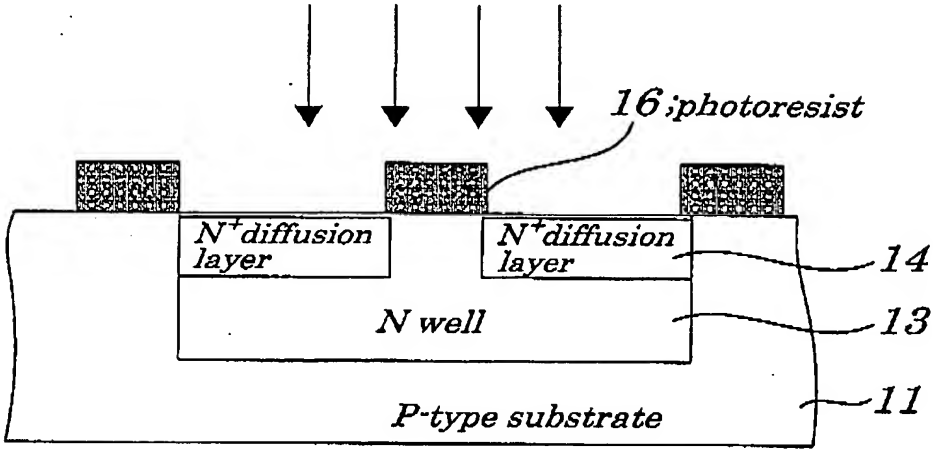
16;photoresist
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.10

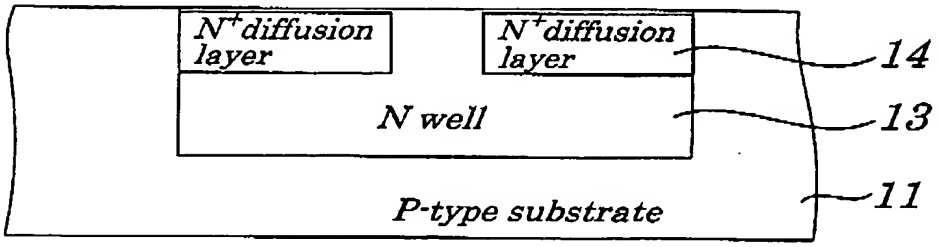
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.11

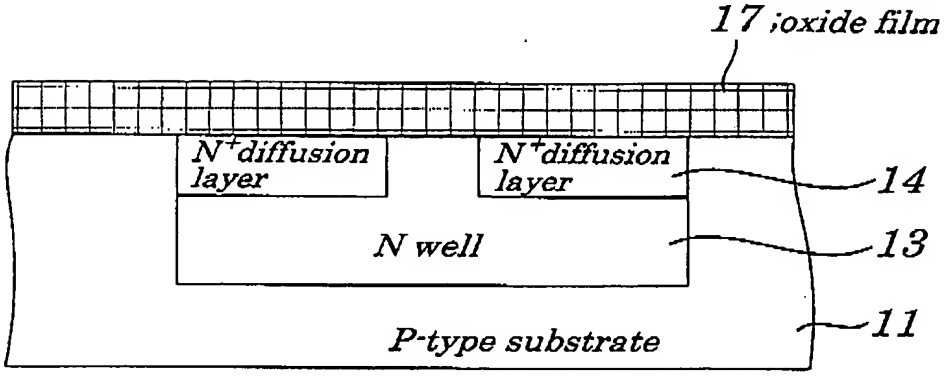
17 ;oxide film
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.12

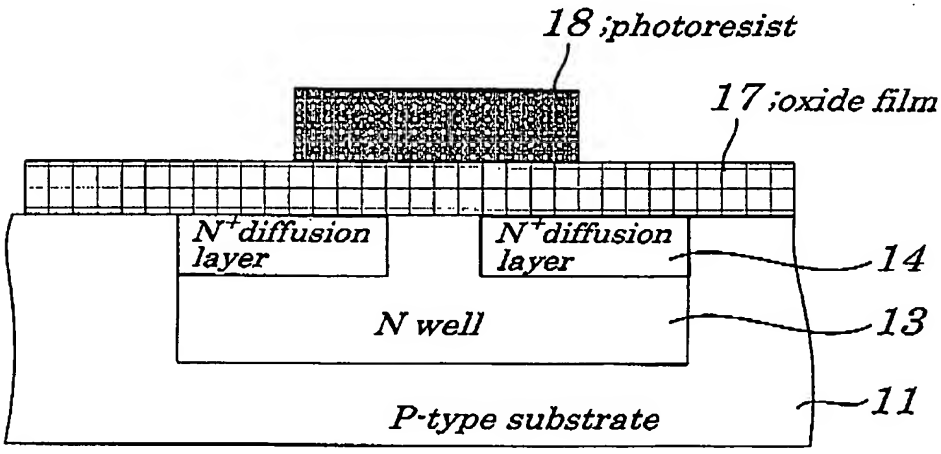
18 ;photoresist
17 ;oxide film
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.13

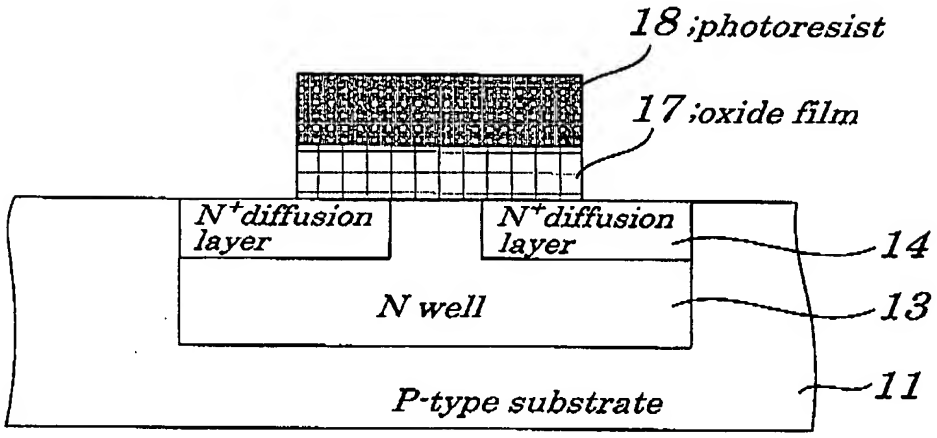
18 ;photoresist
17 ;oxide film
N+diffusion layer
N+diffusion layer
14
N well
13
11
P-type substrate

FIG.14

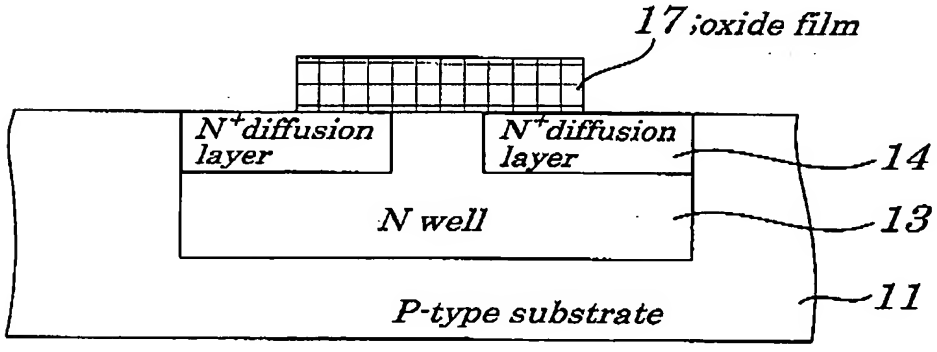
17 ;oxide film
N+diffusion layer
N+diffusion layer
14
N well
13
11
P-type substrate

FIG.15

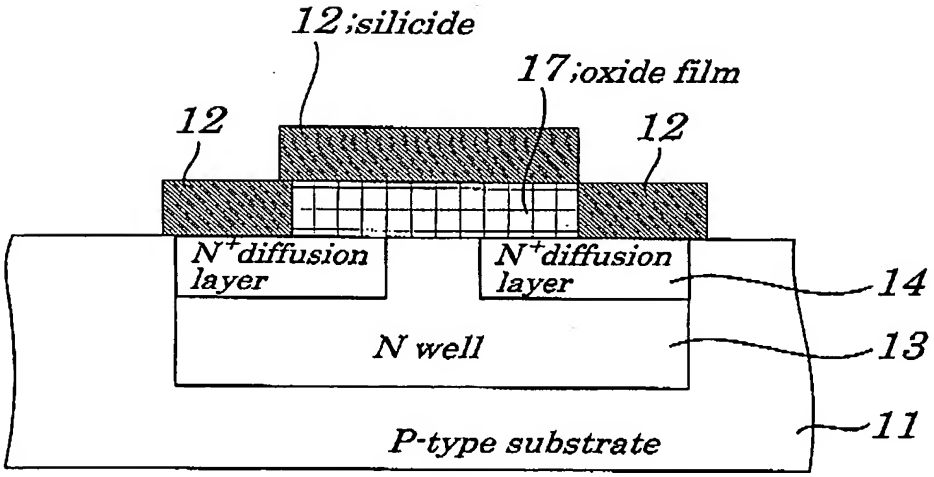
12;silicide
17;oxide film
12
12
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.16

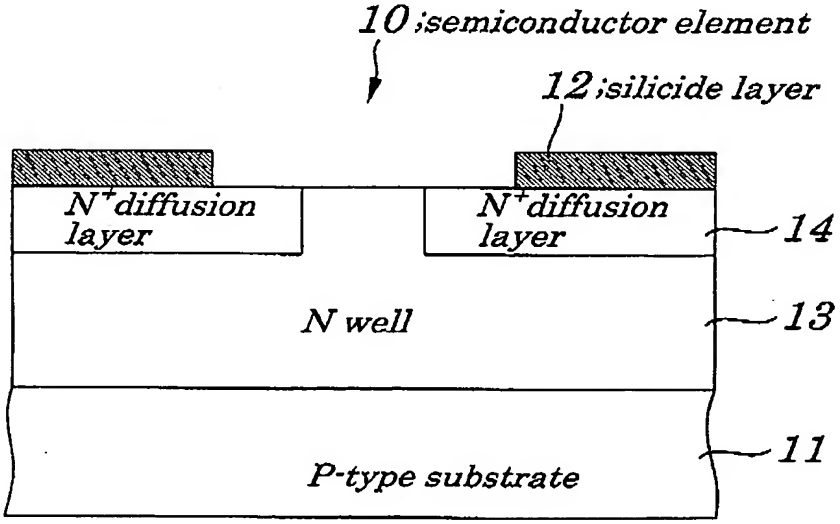
10;semiconductor element
12;silicide layer
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.17

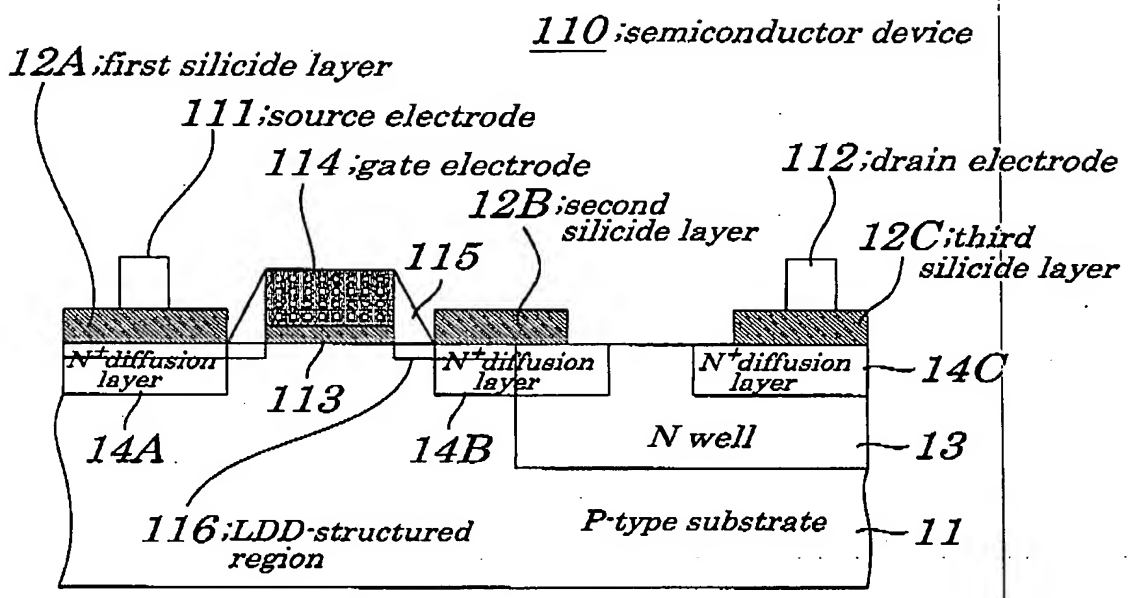
110;semiconductor device
12A;first silicide layer
111;source electrode
114;gate electrode
112;drain electrode
12B;second silicide layer
12C;third silicide layer
115
N+diffusion layer
N+diffusion layer
N+diffusion layer
14C
113
14A
14B
N well
13
116;LDD-structured region
P-type substrate
11

FIG.18

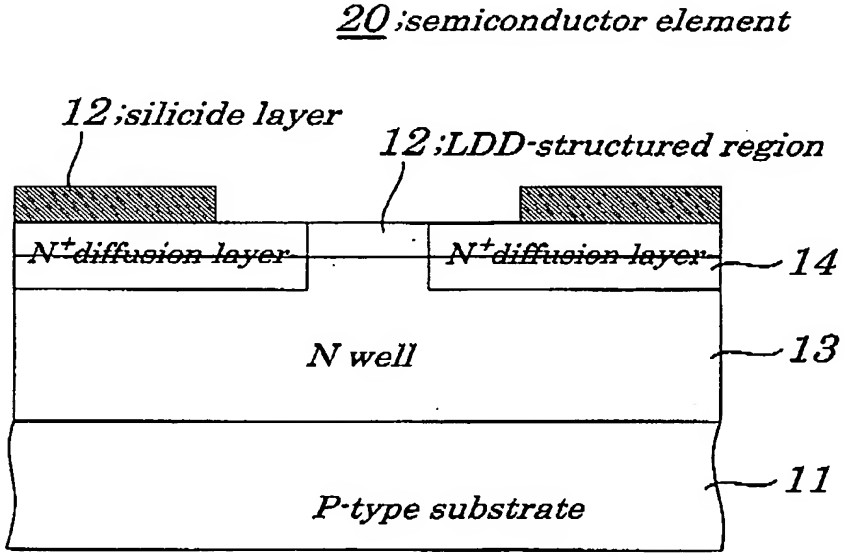
20;semiconductor element
12;silicide layer
12;LDD-structured region
N+diffusion layer
N+diffusion layer
14
N well
13
11
P-type substrate

FIG.19

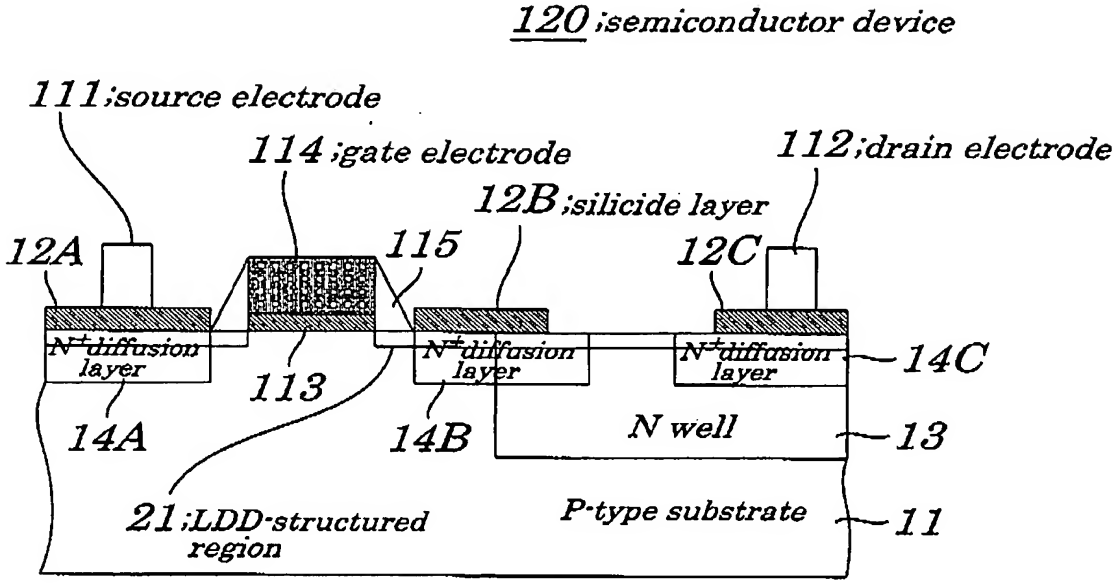
120 ;semiconductor device
111 ;source electrode
114 ;gate electrode
112 ;drain electrode
12B ;silicide layer
12A
115
12C
N+diffusion layer
N+diffusion layer
N+diffusion layer
14C
113
14A
14B
N well
13
21 ;LDD-structured region
P-type substrate
11

FIG.20

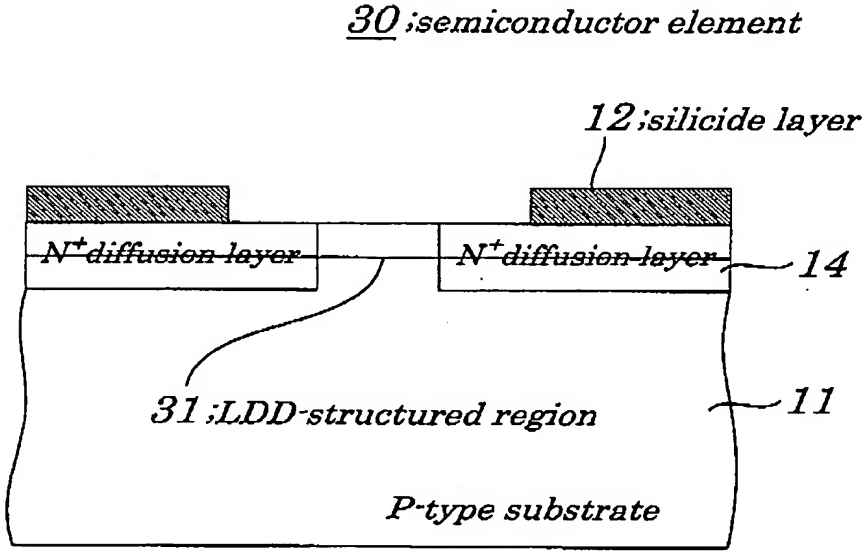
30 ;semiconductor element
12 ;silicide layer
N+diffusion layer
N+diffusion layer
14
31 ;LDD-structured region
11
P-type substrate

FIG.21

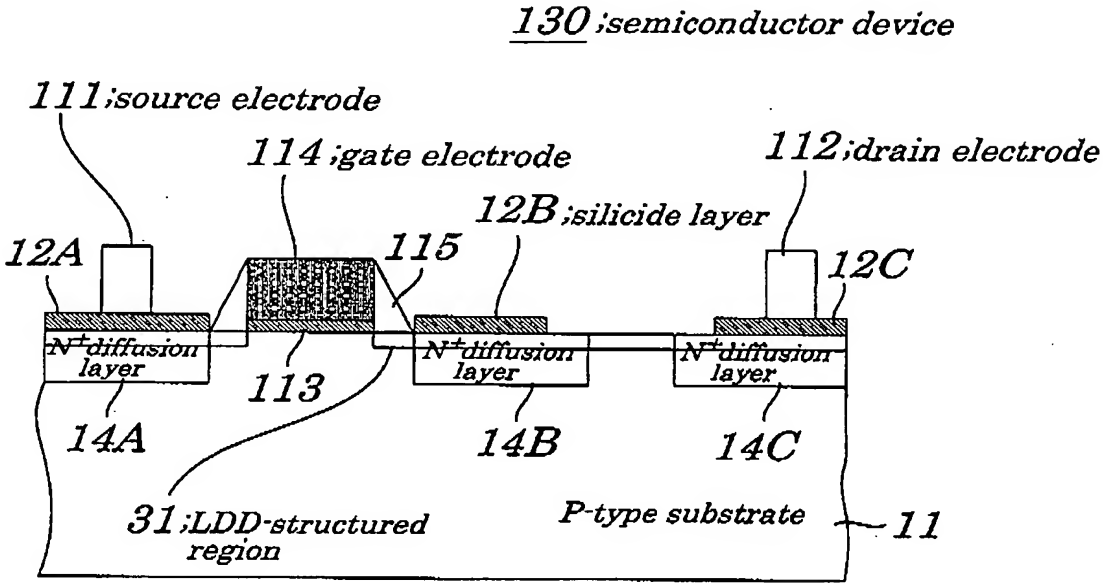
130;semiconductor device
111;source electrode
114;gate electrode
112;drain electrode
12B;silicide layer
12A
115
12C
N+diffusion layer
113
N+diffusion layer
N+diffusion layer
14A
14B
14C
31;LDD-structured region
P-type substrate
11

FIG.22

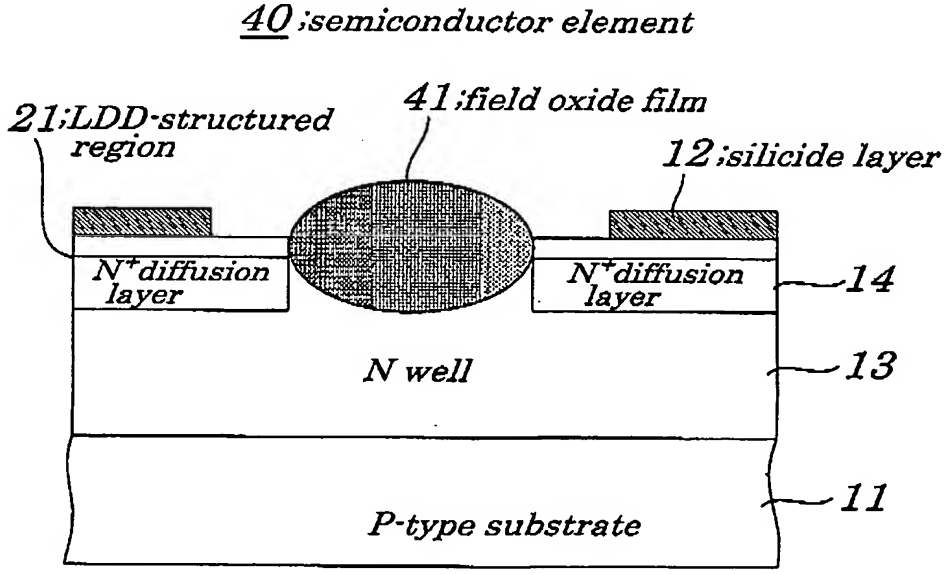
40;semiconductor element
21;LDD-structured region
41;field oxide film
12;silicide layer
N+diffusion layer
N+diffusion layer
14
N well
13
P-type substrate
11

FIG.23

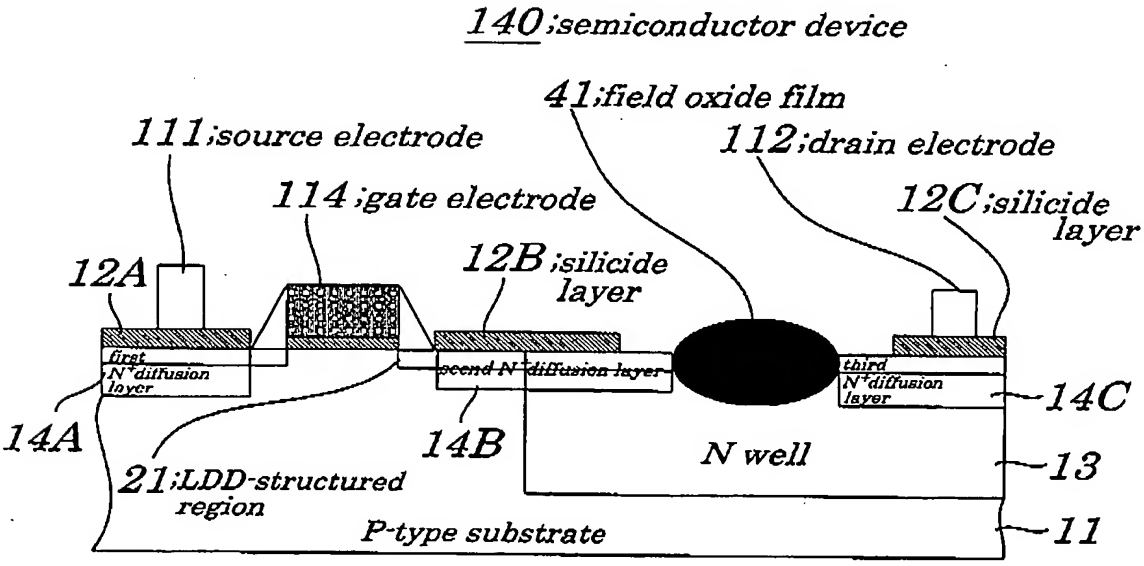
140;semiconductor device
41;field oxide film
111;source electrode
112;drain electrode
114;gate electrode
12C;silicide layer
12A
12B;silicide layer
first N+diffusion layer
second N+diffusion layer
third N+diffusion layer
14C
14A
14B
21;LDD-structured region
N well
13
P-type substrate
11

FIG.24

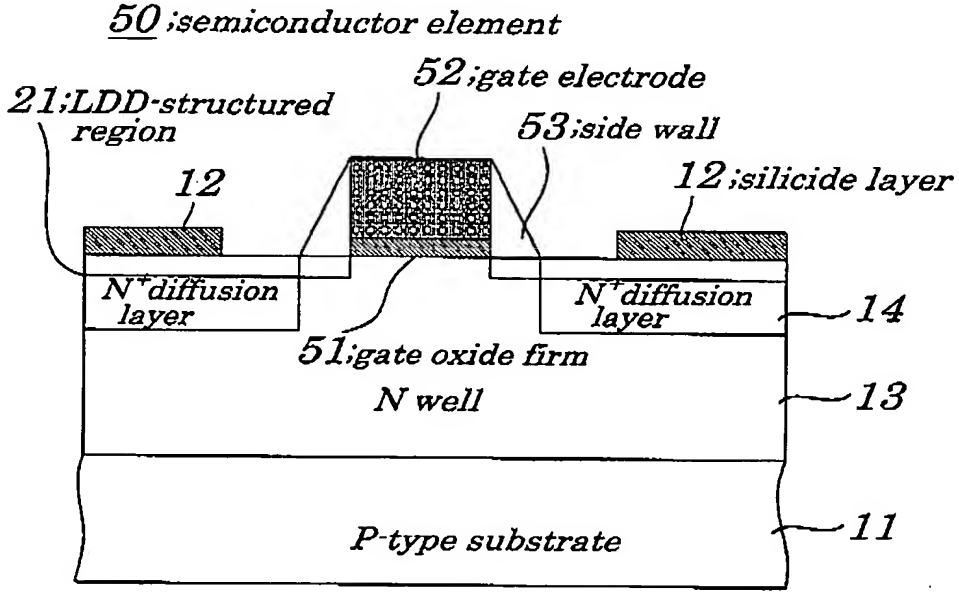
50;semiconductor element
52;gate electrode
21;LDD-structured region
53;side wall
12
12;silicide layer
N+diffusion layer
N+diffusion layer
14
51;gate oxide firm
N well
13
P-type substrate
11

FIG.25

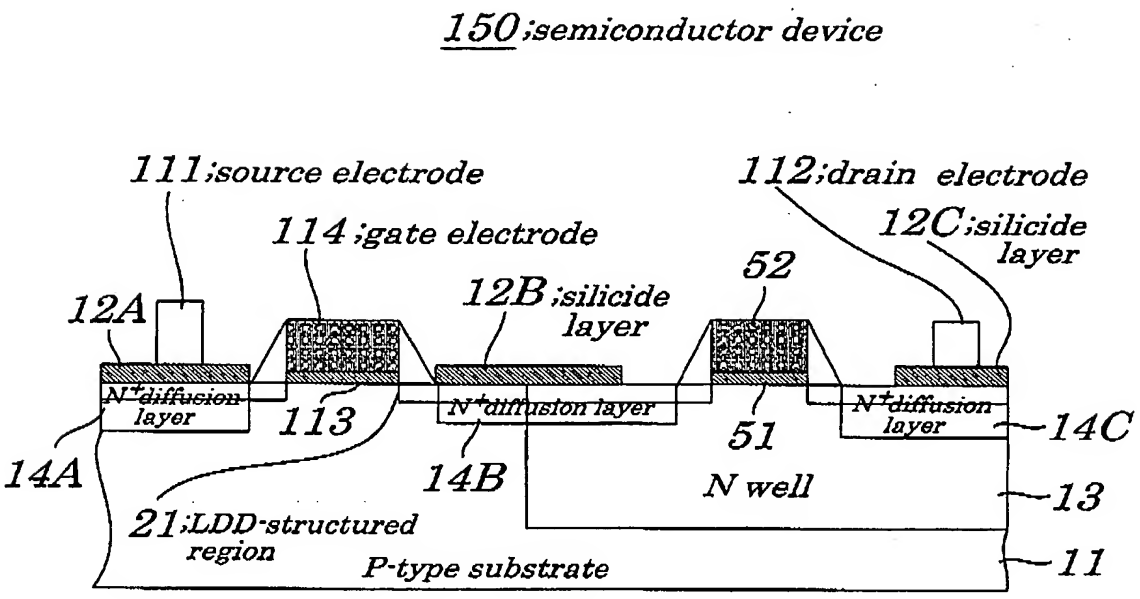

FIG.26 (PRIOR ART)

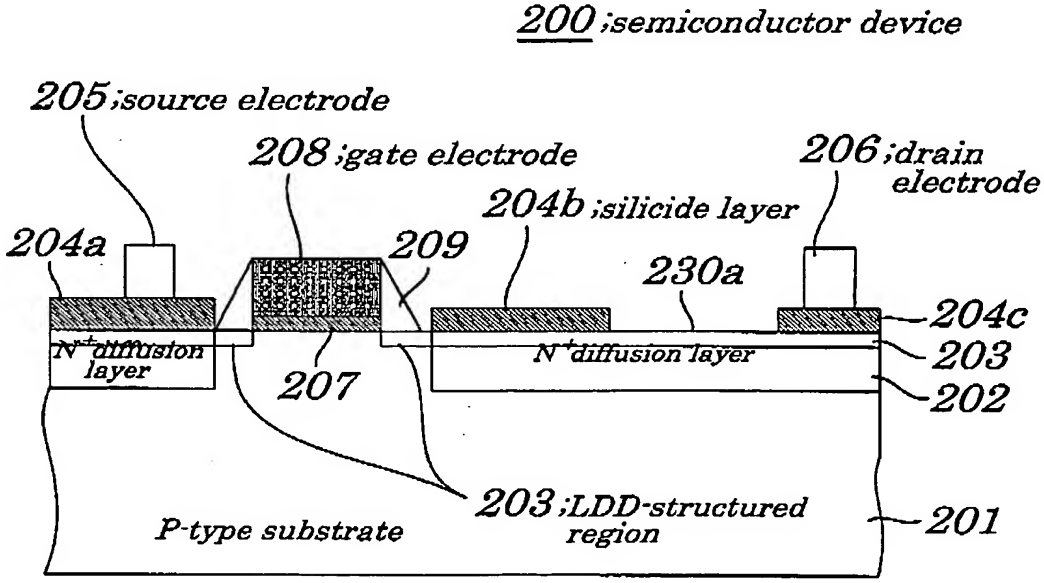

FIG.27 (PRIOR ART)

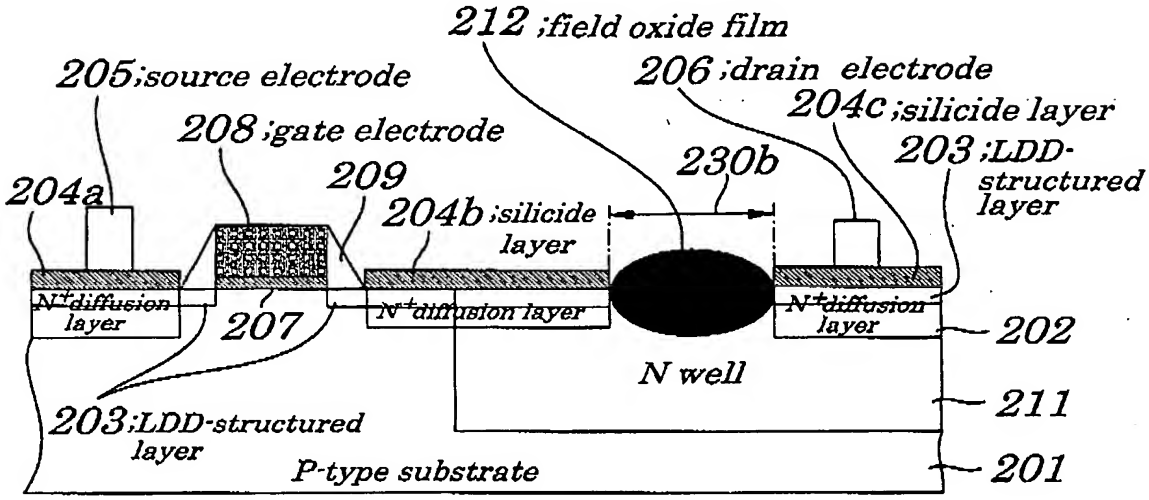

FIG.28 (PRIOR ART)

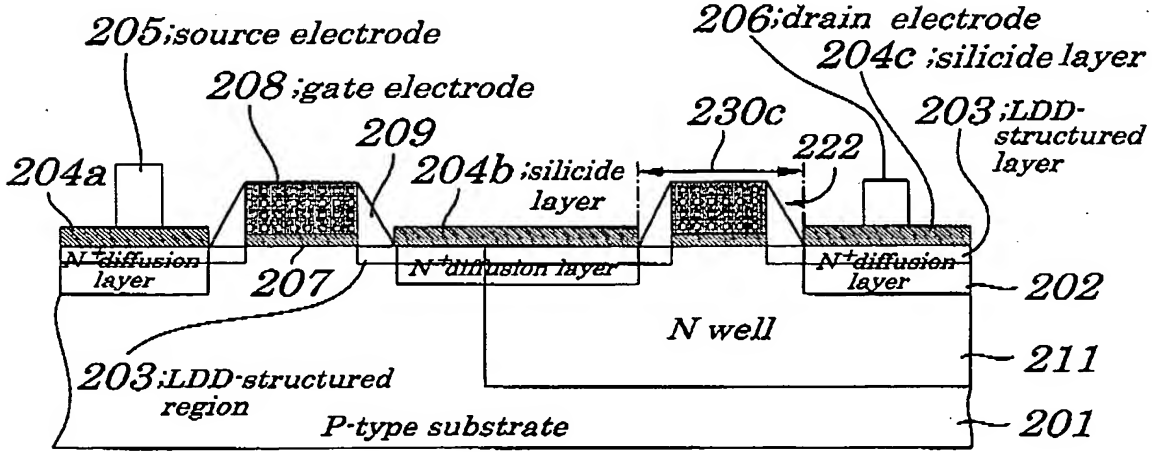

FIG.29A (PRIOR ART)

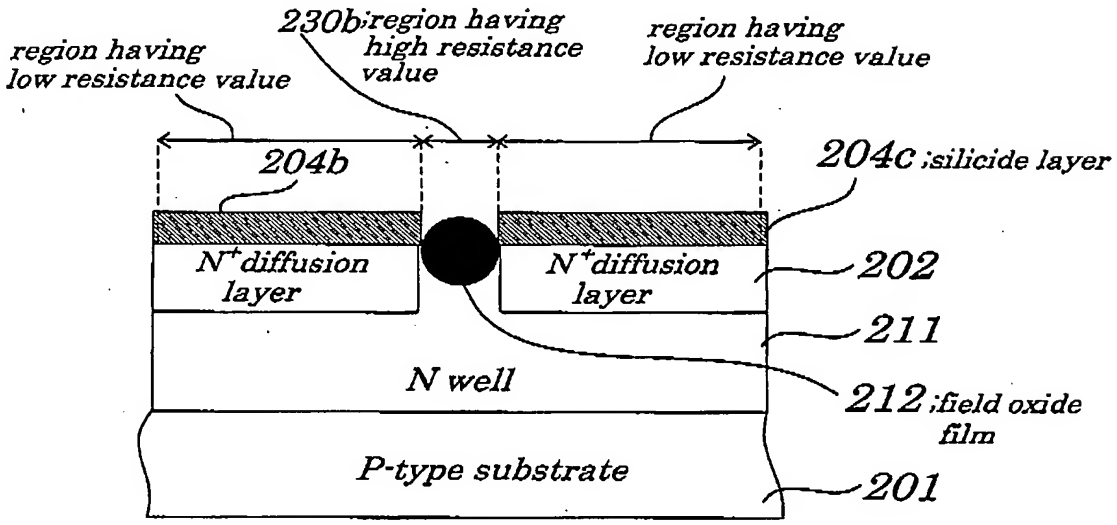

FIG.29B (PRIOR ART)